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Before the
Federal Communications Commission
Washington, D.C. 20554

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In the Matter of	)	
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Amendment of Amateur Service	)	
Rules to Provide For Greater	)	WT Docket No.97-12
the Amateur Radio Service to	)	
Use of Spread Spectrum	)	
Communication Technologies	)	

To: The Commission

COMMENTS
Of
The Central States VHF Society

Background

The Central Sates VHF Society (CSVHFS) was founded in 1967 to promote the use of the VHF, UHF and microwave amateur bands. One of our principal activities is to hold an annual conference in which those interested in the higher amateur frequencies can meet and exchange ideas and information as well as test antennas and other equipment. We invite leaders in the field of higher frequency operation to present papers, which for a number of years have been published in Proceedings form by the American Radio Relay League. Although our membership is not large, compared with some amateur organization, several hundred, they are some of the leaders in the field of amateur VHF, UHF and microwave techniques. Despite the fact the CSVHFS primarily targets those in the Central portion of the U.S., amateurs from all over this country and many overseas countries have attended and participated in our annual Conferences.

It should be noted that the facet of Amateur Radio, to which CSVHFS members devote much of

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their time, is what has been termed "weak signal" work. Those following this endeavor constantly strive for greater and greater distances on all of the amateur bands from 50 MHz through the higher microwave frequencies. This effort has, over the years, led to many contributions to the radio art, including improved performance receiving, and transmitting equipment and more efficient and better antenna systems. Weak signal operators have also learned how to take advantage of various types of anomalous propagation, often missed or ignored by the professionals. These include long haul tropospheric ducting, tropospheric scatter, reflections from ionized meteor trails, the aurora, ionospheric scatter, Sporadic E Layer propagation and various F Layer phenomena. Many have also been very active in developing techniques and equipment needed to reflect their signals off the moon. This is called Earth-Moon-Earth or EME, and requires very exacting station construction and superior operating skills. These activities have led to many advances in the radio art that have found their way into a number of non-amateur applications. It is anticipated that additional advancements will be made by weak signal operators if they are able to continue their activities.

It should be apparent that many weak signal activities require a very low noise level in the receiver, and most amateurs who seriously work the bands above 50 MHz employ receivers with noise figures of 1 dB or less.. This, coupled with the high gain antennas commonly used, make their stations particularly vulnerable to any increase in the noise level. Thus, any significant increase in noise level will render their work impossible, and their continuing contributions to radio communications will, therefore, cease..

Introduction

On behalf of its members and others involved in weak signal work on all of the bands above 50 MHz, CSVHFS wishes to file comments in the Subject Docket, which proposes to liberalize the Amateur Service Rules relative to spread spectrum operation. After reviewing the NPRM and many of the comments filed under RM-8737, we have become concerned that widespread use of spread spectrum may pose a serious threat to weak signal work, when it is operated on the frequencies customarily used for that work.

Summary

CSVHFS understands, and is sympathetic to, the intent of the Commission's Proposed Rule Making to liberalize, and thereby encourage, the development of spread spectrum in the Amateur Service. We feel that various types of spread spectrum may have an application in the kind of work our members, and other weak signal operators, engage in. As noted, our organization has, since its inception, wholeheartedly supported the development of new technologies in and for the Amateur Service, in particular better exploitation of the amateur VHF, UHF and microwave assignments. Although, spread spectrum may represent a significant vehicle for facilitating improved communication between licensed amateurs, we are concerned that it may also present a significant threat to current weak signal activities under the proposed rules. We understand the Commission's desire to provide rules aimed at providing the maximum degree of flexibility for accomplishing the increased use and development of spread spectrum, however, we contend that such rules must be consistent with preserving the viability of current communications capabilities,

especially including those associated with various kinds of weak signal work. We will suggest certain provisions which we believe must be included in any new rules the Commission my adopt to promote the development of spread spectrum techniques which will allow its development without materially impacting existing weak signal amateur activities. These provisions will be outlined in these comments.

CSVHFS believes that, to maximize the flexibility for developing spread spectrum techniques for uses other than its apparent advantages in local communication applications, two classes of spread spectrum should be defined by the Commission and implemented in any new Rules. These will be defined and certain frequency bands suggested for each.

Discussion

While some feel that spread spectrum promises improvement in amateur communication, CSVHFS contends that its unbridled authorization and widespread use, on frequencies customarily used for weak signal work has the potential of rendering useless many of the current communications techniques practiced on the VHF, UHF and microwave amateur bands particularly the weak signal long-haul applications employed by our members..

Some may contend that the fact that spread spectrum has been authorized on 420 MHz and above for over ten years, demonstrates that it poses minimal interference threat to other modes. CSVHFS believes that this argument is fallacious. Even those supporting more flexible rules for spread spectrum have agreed that the number of amateurs using it during this period has been extremely small. Furthermore, CSVHFS is not aware of any tests that have been conducted

between the spread spectrum operators, who were active, and weak signal VHF/UHF operators. No such tests have ever been reported in the amateur press or in papers presented at our annual Conferences. What tests that reportedly did take place, were poorly advertised in advance; and involved only SS operation in the presence of FM voice repeaters, not weak signal stations.

As part of their argument that spread spectrum offers little or no interference to other modes, its proponents cite only occasional short lived signals on a specific channel as characteristic of the type of interference that spread spectrum might present to other modes. Of note is the fact that these illustrations deal only with FM repeaters, not weak signal work such as long haul tropospheric propagation or EME). While this interference scenario may be valid for FM repeaters and a single SS station, or even a few such stations; it is unrealistic if spread spectrum should become a popular mode. It is also invalid for almost all weak signal modes. If spread spectrum does become a popular mode, these short bursts of interference will be repeated by each spread spectrum station on the air at the time. Thus, spread spectrum interference, instead of being an occasional "pip", will take the form of continuous "hash". We have seen calculations that indicate that spread spectrum operation has the potential for raising the noise floor by as much as 50 dB, or even more, over existing levels. With an activity that cannot tolerate a noise floor increase of even a few dB, this will have the effect of eliminating all possibility of weak signal - long-haul work. .

CSVHFS further believes that, if significant interference does result from spread spectrum operation, it will only serve to divide the amateur community and result in impeding the growth

and development of spread spectrum, as well as the cessation of weak signal activity. We are certain that no such eventualities represent the Commission's intent in proposing these rule changes.

CSVHFS feels that a way must be found to foster the development of spread spectrum techniques and still prevent potential serious harm being caused to existing weak signal activities. We believe that these, seemingly contradictory, objectives can be met with the establishment, in any new rules which the Commission may invoke, of provisions prescribing certain frequency segments, in which the kinds of spread spectrum being addressed in the NPRM, shall not be allowed. We will outline our recommendation for these prescribed frequency limits later in these comments.

Automatic Power Control

The NPRM includes a requirement for automatic power control for spread spectrum stations running more than 1 Watt. While CSVHFS applauds the apparent Commission intent of minimizing interference to other amateur operation, we believe that automatic power control will be ineffective in materially reducing spread spectrum interference. We believe that much of the time the spread spectrum stations will be running as much power as they have available, especially if they are sharing spectrum with other stations using other modes - particularly if those stations are running considerable power, as many weak signal operators do.

Two Kinds of Spread Spectrum

In a paper given at the our 1996 Conference, Tom Clark W3IWI and Phil Karn KA9Q presented

a case for the use of spread spectrum-like techniques for enhancing weak signal communication such as EME and long haul terrestrial. CSVHFS believes that the types of techniques discussed in this paper may have potential for the kind of work our members, and other weak signal operators, do. We would like to see the rules written so as to permit experimentation with these kinds of spread spectrum. We feel that this can be accomplished while not allowing spread spectrum operation to materially impact other operation. To do this, we suggest that the Commission define two types of spread spectrum. One type might be called "Broad Band" and the other "Narrow Band".

The bandwidth of spread spectrum being proposed in this NPRM appears to be undefined but CSVHFS believes what the Commission is proposing would occupy bandwidths considerably greater than that of "conventional" modes such as voice FM, AM and SSB. Hence, we would proposed it be termed "Broad Band". The "Narrow Band" type of spread spectrum such as that discussed by Clark and Karn in their paper, might occupy a bandwidth of perhaps 10 kHz. Since it would occupy such a relatively narrow band of frequencies, it is reasonable to believe that it can be accommodated on the VHF, UHF and microwave amateur bands without materially impacting existing weak signal operation.

CSVHFS Proposal

In light of the above, the CSVHFS proposes that a "Narrow Band" version of spread spectrum be defined and authorized on all of the amateur bands above 50 MHz presently open to SSB and AM, so long as the bandwidth of the transmitted signal does not exceed that of an AM voice

signal, e.g. 10 kHz or less.

We also propose that, until more data on the impact of "broad band spread spectrum operation on other modes becomes available, spread spectrum should be prevented form causing potentially harmful interference to existing weak signal operations. Therefore, we propose that the rules state that no Broad Band spread spectrum emissions shall take place in the following segments.

50.0 - 50.5 MHz*
144.0 -144.5 MHz*
222.0 - 222.15 MHz*
431.5- 432.5 MHz
902.0 - 903.5 MHz
1295.5 - 1296.5 MHz
2303.5 - 2304.5 MHz
3455 - 3457 MHz
5759 - 5761 MHz
10367 - 10369 MHz

* These segments are included in case the Commission should decide to authorize spread spectrum on frequencies below 420 MHz.

Conclusion

CSVHFS believes that spread spectrum operation should be encouraged. It may eventually prove valuable for a variety amateur applications However, we contend that, until more information is available on its impact on existing amateur activities, spread spectrum operation should be allowed only on band segments that will not significantly impact weak signal operation and perhaps render such operation untenable.

CSVHFS contends that, provisions limiting the frequency segments on which spread spectrum is authorized, is consistent with existing Commission policy in the Amateur Service, and cite, as

examples, the fact that voice operation has been limited to certain segments in the HF and VHF amateur bands for many years. In addition, unattended digital operation is restricted to certain small segments of the HF bands and Unattended Beacon Operation is allowed only in small segments of the 10 meter, 6 meter, 2 meter, 1-1/4 meter and 70 cm bands. Also, repeaters are allowed only in certain band segments.

It is recommended that the Commission incorporate these suggestions in formulating new Rules designed to foster widespread use of spread spectrum among amateur radio operators.

In addition CSVHFS proposes that the Commission authorize two types of spread spectrum. One that could be termed, "Narrow Band", would be authorized anywhere above 50 MHz where SSB and AM are allowed, as long as the transmitted bandwidth does not exceed 10 kHz. The other, that could be called "Broad Band", would be authorized anywhere, except in the segments listed above. We believe that this course will allow amateurs to develop spread spectrum technology and continue to do other notable work to further develop all facets of the radio art.

RESPECTFULLY SUBMITTED,

Gerald Handley

Gerald Handley WA5DBY
Board Chairman

May 2, 1997

Mailing Address:
809 Pin Oak Lane
Arlington, TX 76012

E-Mail: handley@fastlane.net

Appendix A

Part 97 of Chapter 1 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

Part 97 Amateur Radio Service

All other provisions contained in NPRM 97-12 are retained except as noted:

97.305 Authorized emission types

SS (spread spectrum) emission with bandwiths wider than 10 kHz are prohibited from the following frequency segments:

50.0 - 50.5 MHz*

144.0 -144.5 MHz*

222.0 - 222.15 MHz*

431.5- 432.5 MHz

902.0 - 903.5 MHz

1295.5 - 1296.5 MHz

2303.5 - 2304.5 MHz

3455 - 3457 MHz

5759 - 5761 MHz

10367 - 10369 MHz

(* These frequencies included only in case the Commission should decide to authorize spread spectrum on bands lower than 420 MHz.)

SS (spread spectrum) emissions with bandwidths of 10 kHz or less are authorized on the following frequencies:

50.1 - 54.0 MHz

144.1 - 148.0 MHz

All frequencies above 222.0 MHz subject of other existing limitations.

Emission Types.

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(b) A station may transmit test emissions on a frequency authorized to the operator for brief periods for experimental purposes, except that no pulse or SS modulated signals with bandwidths greater than 10 kHz may be transmitted on any frequency where pulse or SS are not specifically Authorized.